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colored glasses (by far the fairest test), confirm those of Galton.

Experiments of this kind are far more satisfactory than those in which composite portraits are made from the same components taken in different orders: for one has to decide in the one case merely on the identity or difference of tint of disks or rectangles placed side by side on the same plate; in the other, of faces with their manifold detail.

Answers to both of these questions as to order and time of exposure would be found in knowledge of the rate at which light acts upon the silver salts of the photographic plate.

If the rate of this action is constant up to the point of a 'full-timed' plate, then the order in which the negatives are taken can make no difference, provided each successive fractional exposure is of equal length, and the image is in each case equally illuminated. If the velocity with which the chemical action proceeds is not constant, then the order will obviously make a difference in the result, unless the exposures are prolonged or shortened, or the illumination made stronger or weaker, as the velocity decreases or increases.

As far as I am aware, we have no knowledge of the rate of chemical action in this instance, except that which is given by the experiments above referred to, and which points to a constant rate of action within the limits of ordinary photographic exposures. Thus Galton's process appears as a valuable auxiliary in the investigation of an interesting point of the obscure field of photographic chemistry.

The possibility of the 'prepotency' of some individual of the group as a disturbing element was suggested in *Science*, v. No. 118, and has since been discussed by Mr. Jastrow in vol. vi. No. 134. Since the composite portrait is the result of the action of light on the silver salts, it would seem plain that no one face, however 'individual,' 'powerful,' or 'characteristic' it may be, can be prepotent in controlling the result. We must conclude that the apparently prepotent face is merely a close approximation to the type or average of the group.

In the hope that more may be induced to do something in composite photography, I would say that excellent results can be obtained with an apparatus which is by no means elaborate or costly. A camera for the purpose can be made of soft wood by any skilful carpenter. It need differ from the usual form only in having a mirror which is hung within so that it can swing down to an angle of 45° for the adjustment, and up against the top for exposures; and an opening in the top, over which a ground-glass plate is fixed. On this ground glass the fiducial lines are drawn

in lead-pencil, and the images focused and adjusted. It must be at the same optical distance from the lens (the light being reflected to it by the mirror) as the ground glass at the back of the camera. A piece of ground glass placed behind the negatives will serve very well in place of a condensing lens for lighting them, and it is not necessary to enclose the gas jet in a lantern.

In order to give accurately timed exposures, I use a pendulum consisting of a wooden rod with sliding weights above and below the point of suspension, and having an arm at right angles to it. At the extremity of this arm is a screen of card or ferrotype plate, which, when the pendulum is swinging, plays up and down in front of the camera tube. Matters are so arranged, that, when the pendulum is at rest, the lower edge of the little screen lies across the horizontal diameter of the tube. After the negative is adjusted, the screen is held down so as to cover the end of the tube, while the slide in front of the sensitive plate is drawn, and then released and allowed to make a double vibration. The time of exposure is that of a single vibration of the pendulum, and this is regulated by adjustment of the sliding weights.

I find, as others have doubtless found, that the best composites are obtained from very 'dense' negatives. Those from which the composites in this number were taken were made for me by Mr. Lovell of Northampton, who succeeded admirably in obtaining strong negatives of very uniform density.

JOHN T. STODDARD.

NATIONAL EDUCATION ASSOCIATION.

IN point of numbers, the National education association meeting at Topeka, Kan., was among the most important ever held. As far as permanent educational literature is concerned, however, the contributions hardly correspond to the size of the gathering. The real value of such meetings must always be found in the quiet friction of mind with mind, and in the informal talks where men learn the experience of their fellow-teachers and become acquainted with the educational sentiment of distant sections. There is no better place than these to feel the educational pulse, and learn the temper of teachers on mooted points.

Both in the association and the council that preceded, the subject of industrial education was discussed at great length and with the widest divergence of opinion. Dr. S. H. Peabody of Illinois presented the report, which was an admirable paper, clearly and without prejudice outlining the theory of industrial education. To an outsider this whole question seems unnecessarily forced to the front. Only three per cent of our

population are living by the branches of industry in which it is proposed to establish departments of instruction. Still further, one who watches the boy of to-day will hardly find him lacking in practical ability. The great need is rather moral and political training and general culture. Principal Council of the Alabama (colored) normal school at Huntsville gave explicit and convincing testimony to the value of manual training in his school; but the condition of the south, especially that of the colored people, is so abnormal and so different from that in other parts of the country, that a general argument cannot be fairly based on it. The negro is not simply illiterate, he is ignorant, — ignorant of thrift, of ways of living, of all that goes to make a prosperous citizen; and industrial education is simply one of many ways to help him. Besides, the educational system at the south is a bare outline. It will stand some filling up. But in the north, and at the east especially, the school system has taken on load after load, until its friends momentarily wait in anxiety lest it reach the breaking-point. The enemies of the public schools are foremost in insisting that its load be increased, doubtless not without sinister reasons.

Pres. William Preston Johnson of Tulane university, Louisiana, in his paper on education in his own state, spoke of Louisiana as lowest in the scale of literacy, only forty-nine per cent of its population being able to read and write. He pleaded for the national aid proposed by the Blair bill. There was, however, in his paper, nothing to offset the arguments that have been urged against the bill. It is hard for a close student to see how the mere lavish outlay of money is greatly to overcome conditions which money can only indirectly and remotely affect.

In the department of higher education Dr. Mowry of *Education* read a paper on 'The college curriculum.' The subject was well thought out, but presented from the ultra-conservative point of view, which is meeting such sharp criticism in many quarters at the present time. The sense of the crowded meeting in which Dr. Mowry's paper was read, was, however, clearly with him. The discussion was sharp.

The subject of alcohol and narcotics occupied large space in the meetings. The presentation was vigorous, though nothing was set forth new to those familiar with the work.

A department of secondary education was formed at the request of the high school and academy men present. It will be restricted exclusively to work between the elementary schools and the colleges.

The department of musical education suffered a

serious loss in the absence of its president, Dr. G. Stanley Hall, who was detained at Ashfield, Mass. The papers read offered no noteworthy addition to the present literature of the subject.

The kindergarten and industrial displays were unusually attractive; the Kansas agricultural college occupying a prominent place, and displaying some excellent work.

Altogether the meetings may be held a success. The place chosen was hardly fortunate, public accommodations were frightfully limited, and the heat at times was appalling. But western hospitality never showed itself in a more enthusiastic and delightful way. Houses and hearts were cordially open, and the torrid weather was cool compared with the welcome extended on all sides.

THE HEALTH OF NEW YORK DURING JUNE.

THE population of New York on the first day of June may be considered as 1,435,290. Of this number, 2,762 died during the month, an excess of three as compared with May. While, however, the total mortality for the two months was so nearly the same, the number of deaths of children under five years in June greatly exceeded that of the preceding month: the deaths in June being 1,375, as compared with 965 in May; or, to represent it in another way, had the conditions in June been the same as in May, 410 children whose deaths are recorded at the health office would now have been alive. The greatest daily mortality from all causes occurred on the 26th. On that day 124 persons died, 43 of them being under one year of age, and 66 under five, or more than one-half of the total mortality being children of this tender age. The causes of death on this day were as follows: 32 persons died from diarrhoeal diseases, 13 from consumption, 12 from diseases of the brain and nervous system, 8 from diseases of the kidneys, 5 from diphtheria and the same number from cancer, 4 from pneumonia, 3 from croup, and 2 from rheumatism and gout. Consumption still leads the list as a mortality factor; taking the month as a whole, 423 persons having succumbed to that disease, 72 less than in May. Diarrhoeal affections increased more than four-fold, these deaths being 303, as compared with 73 in May. Diphtheria, with 130 deaths, showed a reduction of 35 deaths; while scarlet-fever is charged with but 29 deaths, as against 44 in the month preceding.

The meteorology of the month is full of interest. The mean temperature for the year has been as follows: January, 26.79° F.; February, 27.45° F.; March, 37.60° F.; April, 52.87° F.; May, 60.18° F.;